The EnviroMed Services, Inc. final report with appendixes, dated May 8, 2006 is available at the Stanley Jablonski Center, 40 Moody Road.

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ENVIROMED SERVICES, INC.

Dieldrin and Chlordane Sampling and Indoor Air Quality Evaluation

Enrico Fermi High School
124 North Maple Street
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prepared for:

Town of Enfield
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I. NARRATIVE

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Summary

EnviroMed Services, Inc. was retained by the Town of Enfield to perform an indoor air quality evaluation in the school building following the presence of the pesticides found in the soil samples collected during preparation for planned improvements to the athletic fields. Two pesticides, dieldrin and chlordane were found in the shallow soil samples at greater than Connecticut Department of Environmental Protection's clean up criteria in various locations in the athletic fields and in the landscaped areas around the high school building. The possibility exists that these pesticides may have been transported to the school via foot traffic, wind and/or air circulation.

In order to confirm the presence or absence of pesticides inside the Enrico Fermi High School building, air samples and limited surface wipe samples for the presence of dieldrin and chlordane were collected between March 29 and April 5, 2006. Indoor air quality monitoring of baseline parameters (temperature, relative humidity, carbon monoxide, carbon dioxide and dust particulate) was also conducted.

Assessment and Monitoring

Methodology

Based on the visual observations of the school facility and discussion with Town of Enfield representatives, the following sampling scheme was employed:

- Sampling for the presence of dieldrin and chlordane in the air was conducted in the occupied areas of the school building during and after school hours. Sampling devices were placed strategically, where possible, in the breathing zone (approximately 4 feet above the floor to simulate potential exposure of seated students) in the middle of the sampled classroom and other school locations.

    1. Samples for airborne concentrations of dieldrin per Modified NIOSH method S-283 were collected using 37 millimeter, glass fiber, 2-pc cassettes.

    2. Samples for airborne concentrations of chlordane per OSHA method 67 were collected using OSHA Versatile Sampler tubes containing a glass fiber filter and two sections of XAD-2 adsorbent.

Both media were attached to low volume monitoring pumps as shown on the drawing and photographs in Appendix D, calibrated at approximately 1 liter per minute.

Sampling pumps were turned on and allowed to run for approximately six to seven hours. Once the monitoring was completed, the filter from the 37-mm cassette was transferred; using tweezers, to a 15x45 mm clear vial with teflon lined cap within one hour after sampling. XAD-2 tubes were capped on both ends and sampling media were transported to American Industrial Hygiene Association (AIHA) accredited laboratory (Environmental Health Laboratory of Cromwell, Connecticut) for analysis. See Appendix D for sampling protocol.

- Collecting limited preliminary wipe samples from Wing D and several Classrooms in Wing A of the Main Level was performed to evaluate pesticide concentrations in the accumulated dust. Wipe samples were collected from 10 square centimeter areas on various surfaces including floor, shelves, and window sills, by using glass fiber filters.

  Once the sampling was completed, the glass filter was transferred, to a 15x45 mm clear vial with teflon lined cap immediately after sampling. The samples were sent to an AIHA accredited laboratory for analysis by Gas Chromatography; OSHA 67 and Modified NIOSH S283. See Appendix B for *Pesticides Wipe Sample Location* diagram.

- Baseline indoor air quality parameters including temperature, relative humidity, carbon dioxide, carbon monoxide and real-time total particulate (dust) were measured in each sampled area (during sampling) with a TSI Q-Trak IAQ Plus Monitor and MIE *p*DR 1000 Particle Analyzer.

II. Results of Testing

Pesticides in the Air

- Samples for airborne concentrations of dieldrin and chlordane were analyzed by an AIHA accredited laboratory using Modified NIOSH method S-283 for dieldrin and OSHA method 67 for chlordane.

- The concentration of dieldrin and chlordane in all air samples collected from the interior of the Enrico Fermi High School building in Enfield, Connecticut were reported to be below the laboratory detection limits of 0.0100 µg or 0.0200 µg for both dieldrin and chlordane depending on the sample time and the sample air volume. See Appendix A, Table 2 for *Dieldrin and Chlordane in Air Analytical Results.*

Pesticides in the Wipe Samples

- In addition to the air sampling, limited preliminary wipe samples were collected on various surfaces including floor, shelves, and window sills, by using glass fiber filters.

- All preliminary wipe sample results collected from the various surfaces inside the school building were reported to be below the laboratory detection limit of 0.0200 µg for both dieldrin and chlordane. See Appendix A, Table 3 *Dieldrin and Chlordane Analytical Results, Wipe Samples.*

Baseline Indoor Air Quality Monitoring

- *Temperature:* The average indoor temperature recorded in the sampling period between March 29 and April 5, 2006 was 73.3°F with a range from 66.2°F to 77.7°F. In comparing this data to the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) guidelines for thermal environmental conditions for Human Occupancy (55-1992), it is determined that average indoor temperature of 73.3°F was within the recommended range for winter (68°F to 75°F). The average outdoor temperature within the sampling period was 55.1°F.

- *Relative Humidity:* The average indoor relative humidity was 20.0% with a range from 10.4% to 41.6%. In comparing this data to the ASHRAE recommended range for indoor relative humidity of 30% to 60%, it is determined that average relative humidity throughout the building was below the recommended range. The average outdoor relative humidity during the sampling period was at 25.7%. Relative humidity indoors is expected to sometimes be below the recommended range in the cool weather seasons due to both outdoor weather conditions as well as heating of the air by boiler operations both which may contribute to lower humidity. This is due to the relationship of air temperature and humidity.

- *Carbon Monoxide:* The indoor carbon monoxide concentration readings ranged from 0.0 ppm to 2.1 ppm with the average indoor carbon monoxide concentration at 0.5 ppm. These concentrations are well below the Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for industrial exposure of 35 ppm for eight hours. The concentrations are also well below the U.S. Environmental Protection Agency National Ambient Air Quality Standard for outdoor air of 9 ppm for eight hours. Although these levels are for outdoor air, in an office/school setting inside air should be of equal or better quality. The average outdoor carbon monoxide concentration was 1.3 ppm.

- *Carbon Dioxide:* The indoor average carbon dioxide concentration was at 470 ppm with a range from 386 ppm to 885 ppm. The average outside carbon dioxide concentration during the sampling period recorded was 390 ppm. According to the ASHRAE Standard 62-2001, Ventilation for Acceptable Indoor Air Quality, the difference between the indoor and outdoor concentrations should be less than 700 ppm. The difference between the indoor and the outdoor carbon dioxide concentrations in all samples collected was less than 700 ppm.

- *Real-Time Total Particulate (Dust).* Real-time indoor total particulate readings ranged from 0.001 milligrams per cubic meter (mg/m^3) to 0.024 mg/m^3 with an average at 0.006 mg/m^3 during the sampling period. These levels are well below the OSHA PEL for total particulate of 15 mg/m^3 for an eight-hour TWA. The average outdoor real-time particulate reading was 0.007 ppm.

See Appendix A, Table 1 for *Indoor Air Quality Monitoring Results.*

III. Conclusions and Recommendations

Based on the results obtained during the pesticides in the air sampling and indoor air quality evaluation in the occupied areas of the Enrico Fermi High School located in Enfield, Connecticut, EnviroMed Services, Inc. makes the following conclusions and recommendations:

Conclusions

- The concentration of dieldrin and chlordane in all air samples collected from the interior of the Enrico Fermi High School were reported to be below the laboratory detection limits.

- All limited preliminary wipe sample results collected from the various surfaces in selected areas of the school building (floor, shelves, window sills) were reported to be below the laboratory detection limit.

- The average indoor temperature recorded during the sampling period at 73.3°F was within the ASHRAE recommended range for Winter (68°F to 75°F).

- The average indoor relative humidity reading of 20.0% was below the ASHRAE recommended range of 30% to 60%. The lower humidity level, common in the winter, may cause eye, nose and throat irritation, itchy skin and bloody nose.

- The average indoor carbon monoxide concentration throughout the sampling period was below the OSHA PEL and below the U.S. EPA National Ambient Air Quality Standard.

- The average carbon dioxide concentration recorded throughout the sampling period was below the OSHA PEL, and within the ASHRAE guideline that the difference between the indoor and outdoor concentrations should be less than 700 ppm.

- The average real-time indoor total particulate (dust) reading at 0.006 mg/m^3 is below the OSHA PEL for total particulate of 15 mg/m^3 for an eight-hour TWA.

Recommendations

- Any activities performed in the vicinity of the school building that would include soil or dust disturbance shall be performed following all applicable regulations.

- During any activities that may disturb pesticide contaminated soils or dusts; air and wipe sampling should be performed within the school facility to evaluate the potential for migration of pesticides.

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- As a precautionary and preemptive approach, EnviroMed Services recommends sustained attention to housekeeping practices in order to reduce the accumulation of dust in the building.

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